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ABSTRACT

This paper offers a method for evaluating individuals with visual impairments to determine the use of appropriate assistive technologies. The method is based on the HAAT model, which concentrates on the interaction of three factors: Human, Activity, and Assistive Technology. The evaluation process involves six steps: referral and intake, initial evaluation, recommendations and report, implementation, follow-up, and follow-along. Applied specifically to the vocational referral process, the assistive technology evaluation involves obtaining the individual's relevant records and dealing with such complicating factors as failure to include the assistive technology evaluation as part of the Individualized Education or Rehabilitation Plan and lack of statements from persons integral to the application of assistive technology. Also considered are evaluation of the individual's receptive and expressive communication and familiarity with aspects of technology, such as personal computer monitor settings, ability to use a mouse, and ability to use a keyboard. Some guidelines for writing the evaluation report are also given. (DB)

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EVALUATION OF INDIVIDUALS WITH VISUAL IMPAIRMENT FOR EDUCATIONAL AND VOCATIONAL APPLICATIONS OF ASSISTIVE TECHNOLOGY

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People with visual impairments include two large groups: those with low vision and those with blindness. Terminology can become confusing since many people classified as "legally blind" by government standards are people with low vision. Corn (1996) define low vision as a vision loss that cannot be mdeically corrected but still allows some useful vision. Low vision cannot be corrected to normal by regular eyeglasses or contact lens. People who are blind typically have no functional sight, although they may possess light perception. As such, low vision and blindness are considered a disability with respect to educational and vocational involvement.

Many assistive technologies for people with visual impairments have emerged during the past quarter century. These technologies often involve personal computers and peripherals. Leventhal (1996) notes that the changes in technology have had a major impact on the vocational opportunities accessible to individuals with visual impairment. This often translates to job opportunity involving the use of a personal computer. Numerous computer hardware/software and peripheral technologies can assist the individual to equal or surpass to productivity of fellow sighted employees.

Determination of the proper assistive technologies for the individual with visual impairment has become a concern to all persons involved in the visual rehabilitation process. Such concern warrants the development of efficient methods to identify prospective users of assistive technology, determine the appropriate technologies given the individual's abilities, purchase and deliver technology, and verify the effective use of technology. Management of this process is achieved mainly via two different systems in American society: the educational and vocational rehabilitation agencies of State and local government. Each group has a variety of methods for provision of assistive technology services and equipment. There are also some groups and individuals who obtain technologies independent from these governmental groups. This often results in a "pell-mell" approach to the process of obtaining assistive technology.

The step of determining appropriate technologies is often referred to as the evaluation process. The evaluation process can prove difficult due to ignorance of the number of technologies available to the individual and the technology's proper use. Technologies selected during the evaluation process need be of the utmost use to the person with visual impairment since funding for technology is often limited. It can be seen that a well developed method for the evaluation of persons with visual impairments that is performed by qualified and knowledgeable evaluators is required.

Cook & Hussey (1995) define the HAAT model of applying assistive technology. The HAAT model is

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an adapted form of human performance engineering methods described by Bailey (1989). The HAAT model concentrates on the interaction of three factors affecting the process of determining appropriate assistive technology and its use:

(1) Human,
(2) Activity,
(3) Assistive Technology.

These three factors interdependently affect each other and exist within the Context of assistive technology use. The Activity describes areas of performance such as occupational duties which may be effected by enablers. The Human is seen as an intrinsic enabler which has sensors that provide information to a central processor which, in turn, produces an outcome via an effector. The Assistive Technology is seen as an extrinsic enabler that possesses both human/technology and environmental interfaces. The Assistive Technology obtains information mostly from the Human that is sent to a central processor which then produces an outcome in the form of an Activity. Since the Human, Activity and Assistive Technology occur in a Context, they are constrained by the Context.

In summary, the HAAT model described by Cook & Hussey considers the: * Activity: Defines the goal to be achieved.

Human: The skills available to meet the goals.
Context: Defines the constraints on goal achievement.
Assistive Technology: Characteristics are defined by the goals, measured skills, and constraints of the context.
Context, in the HAAT model, defines constraints on goal achievement. When using the HAAT model the way in which appropriate assistive technology is determined is dependent on two new factors:
(1) Definition of the Activity, and
(2) Consideration of the intrinsic skills of the Human to achieve the activity.
Thus, Assistive Technology is seen in the HAAT model as an external way to enable the Human to perform an Activity.
For Cook & Hussey, the process of providing assistive technology services involves a six step process:
(1) Referral and Intake
(2) Initial Evaluatio
(3) Recommendations and Report
(4) Implementation
(5) Follow-Up
(6) Follow-Along

This model assumes the assistive technology evaluator is integrally involved in each step. The author of this paper suspects there are few individuals involved in assistive technology service provision that would disagree with the need for involvement in all six steps. But due to the context in which assistive technology services are typically provided it is highly unlikely that the assistive technology evaluator would be involved in each step. The reason most evaluators are not as involved, as Cook & Hussey describe, is that the evaluator is rarely the primary professional contact for the individual receiving the evaluation. Instead, the primary professional contact is determined by the agency or group which makes the referral to the assistive technology evaluator.

The referring professional for children grades K-12 is typically the special educator or the special educator's supervisor. After the individual has left the educational system, the vocational rehabilitation counselor assumes the role. Often implementation, follow-up and follow-along are either provided by the referring professional or are not provided at all. Thus, it is proposed that the process be defined relative to the evaluation process. While this might not be the ideal method, it recognizes the context (funding and personnel restrictions) in which most assistive technology service provision occurs.

Using the HAAT model and the described context as reference, the following steps are defined relative

to the professional primarily providing service.

(1) Special Educator/VR counselor: Determination of Need & Referral
(2) Assistive Technology Evaluator: Initial Intake, Evaluation, Report
(3) Special Educator/VR counselor: Implementation, Follow-Up, Follow-Along The tasks involved in the Assistive Technology Evaluator's role as defined above compose the remainder of this paper.

Initial Intake procedures involve the collection of information which describe Human, Activities, previous assistive technology used, and the contexts in which the application of assistive technology will occur. For educational referral, this includes at a minimum the Individual Educational

Program (IEP), medical records including the most recent ophthalmological and optometric examinations, and statements from the primary educator and parent/guardian stating the perceived needs of the student. Vocational referral should contain the Individualized Written Rehabilitation Plan (IWRP), medical records, and statements from the rehabilitation counselor and client stating the perceived needs to obtain or maintain employment. If the VR client is employed, a statement from the employer is also essential. Statements can be obtained through telephone interviews. Initial intake is completed once the assistive technology evaluator has obtained and intently reviewed all reference materials.

Summarizing...

Educational Referral obtain:

(1) Individual Educational Plan (IEP)
(2) Ophthalmological, Optometric, and medical records
(3) Statement from primary educator
(4) Statement from parent/child

Vocational Referral obtain

(1) Individual Written Rehabilitation Plan (IWRP)
(2) Ophthalmological, Optometric, and medical records
(3) Statement from vocational rehabilitation counselor
(4) Statement from client
(5) Statement from client's employer

Complicating factors which may cause the assistive technology evaluation to be postponed include:

(1) Lack of intent to include the assistive technology evaluation as part of the IEP or IWRP. (2) Missing health records or the lack of recent examination by vision practitioners. The assistive technology evaluation should not proceed without the results of a low vision examination.
(3) Lack of statements from persons integral to the application of the assistive technology. For example, no involvement of client's employer when the perceived adaptations include modifications to a computer attached to a computer network.
Evaluations should occur in a context as similar as possible to the daily context in which the assistive technology will be used. Often evaluations occur in the student's home room or at the client's place of work. The evaluator should meet privately with the educator or employer to obtain an unfettered statement of concerns. A similar meeting should be conducted with the child/parent or client. After these individual meetings, all parties should be brought together for a discussion of what technologies are to be used in the evaluation. A maximum of two individuals besides the student/client and evaluator should be present during the "hands-on" portion of the evaluation. These individuals should be the discretion to interrupt the evaluation once.
Evaluation requires assessment of the individual's receptive and expressive communication and familiarity with technology:
(1) Receptive Communication modes to be investigated include evaluating the individual's primary mode of reading (grade of braille, size of large print, print modifications).

(2) Expressive communication modes include quality of speech, print, writing, and/or braille.
(3) Technology Familiarity assessment aims to determine not only the individual's current knowledge of technology but also to ascertain the ability of the individual to learn concepts related to the use of technology and to obtain a first hand impression of the individual's use of remaining vision. The following areas are evaluated:
(a) Technologies currently used
(b) Comfort level in learning and using current technologies

Technologies of particular interest

(d) Personal Computer monitor settings
(e) Experimentation with Adaptive software such as magnification or screen readers.
(f) The ability to track the mouse using variations in size, color, and attributes.
(g) Ability to use the keyboard to type and use specialized keystrokes.

Forms have been developed by the author to record and summarize findings throughout the evaluation session.

Reports are developed only after careful consideration of the individual's educational/career goals and observations obtained during the intake and evaluation phases. It is important to note that tasks demonstrated and attempted by the individual being evaluated are not necessarily performed to test out a particular technology, but to obtain knowledge of the person's intrinsic enablers. A qualified evaluator can use such information in determining an appropriate technology application for the individual. Assistive technology evaluators who appear to showcase a particular product or software package should be viewed with concern.

Reports should contain a summary of the information gathered in the Intake phase. The evaluation procedure should be discussed in a brief but concise manner. Comments made during interviews that are critical to the application of technology should be included. Equipment or technology used in the evaluation should be identified along with the results of demonstration and attempts at technology use by the individual. Recommendations should be provided along justification of the recommendation. Equipment and technology recommendations should be summarized with cost estimates and a list of possible vendors. The report should be submitted to the group or individual that requested and paid for the evaluation.

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